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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference P17214-ATO		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 02/10003	International filing date (day/month/year) 06.09.2002	Priority date (day/month/year) 06.09.2002	
International Patent Classification (IPC) or both national classification and IPC H04L1/18			
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 2 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 26.03.2004		Date of completion of this report 22.11.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Perrier, S Telephone No. +31 70 340-4245 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 02/10003

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1, 2, 4-22 as originally filed
3, 3a received on 23.10.2004 with letter of 20.10.2004

Claims, Numbers

1-13 as originally filed

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
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International application No. **PCT/EP 02/10003**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	1-13
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1: US-B-6 275 471 (MUKHERJEE SARIT ET AL) 14 August 2001 (2001-08-14)

D2: EP-A-1 130 839 (MATSUSHITA ELECTRIC IND CO LTD) 5 September 2001 (2001-09-05)

2. INDEPENDENT CLAIM 1

The document D1 is considered to represent the most relevant state of the art, discloses a method for the transmission of a plurality of data packets from a sender to a receiver, wherein the data transmission is performed over a link with a transmission capacity having a limit, and a presentation time is defined for a first data packet of said plurality, and wherein the receiver performs a first check whether data packets are correctly received and at least one data packet is selected for retransmission according to the result of the first check,

The problem solved by the application may therefore be regarded as how to avoid occurrence of self-congestion when retransmissions are performed on a bottleneck link (page 6, lines 28-30 of the present application), the self-congestion may be caused by other packets delayed by retransmissions (see page 3, lines 15-22)

This is achieved by the subject-matter of claim 1, in particular the technical features of determining a delay budget from the presentation time of the first data packet, determining a delay requirement for the retransmission of the selected data packet from the limit of the transmission capacity and from the transmission capacity required for the selected data packet, performing a comparison of the delay requirement and the delay budget, and executing the retransmission for the selected data packet according to the result of the comparison.

The technical effect of these features is to check whether the retransmission of data packets (i.e. the selected data packets) may delay other data packets waiting

for transmission (the first data packets). In this way, it is avoided that these first data packets are delayed by the retransmissions under consideration and have to be dropped at a later time, this idea is not shown in the prior art. In the prior art, it is only checked whether the retransmissions under consideration may arrive late (e.g. D1, column 5, lines 53 to 55, step S520 in D2). However, the prior art does not check if any retransmission may delay other data packets so that those other packets would be dropped.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The subject-matter of the present invention as claimed in claim 1 is neither disclosed in, nor rendered obvious by the remaining prior art document cited in the International search report. The subject-matter of claim 1 therefore is considered to be new and involve an inventive step, Article 33(2) and (3) PCT.

3. INDEPENDENT CLAIMS 11 TO 13

Claims 11 to 13 comprise features which are identical or corresponding to some of those specified in method claim 1 and therefore an argumentation similar to that under paragraph 2. applies to the apparatus and program claims 11 to 13.

Consequently, the subject-matter of claims 11 to 13 is considered to be new and involve an inventive step, Article 33(2) and (3) PCT.

4. DEPENDENT CLAIMS 2 TO 10

Claims 2 to 10 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

to check whether the requested packet can arrive at the receiver before the required presentation time. If this is the case, the retransmission is performed. Else, the packet is not retransmitted and the receiver constructs the output of the application without the lost packet, e.g. by using error concealment
5 techniques.

Between the server and the client, the data packets are transported by one or several transport networks, typically over a plurality of links with different characteristics. Often, one of said links is a bottleneck for the transmission as it
10 has the lowest data rate and/or a high round trip time, the latter influencing especially the delay of retransmissions. In wireless communication systems, the bottleneck is generally the wireless link to a mobile user equipment, e.g. a mobile phone.

15 On a link with limited bandwidth, self-congestion may occur. If data packets are retransmitted, the server has to ensure that the total traffic comprising both original packets and retransmitted data packets does not exceed an allowed or guaranteed bitrate. Due to the limitation, original data packets are often delayed when a retransmission is performed, especially if the data rate of the original
20 data packets is close to the link capacity. This delay can disturb the presentation behavior of the data stream by the streaming application, which may be interrupted or may need to apply error correction or concealment.

The data rate may vary considerably for some types of links, e.g. according to
25 the behavior of other users sharing the same resources, while other links provide a constant or nearly constant bandwidth for transmission. For example, UMTS streaming bearers transporting the data packets to mobile clients can be negotiated for specific combinations of guaranteed bitrate, packet loss, and delay for the data packets. Many streaming applications allow an adaptation of
30 the stream to guaranteed parameters, e.g. by selecting the rate of original data below the guaranteed bitrate, allowing a rate of retransmissions according to